

1 **FABRIC PAD BEARING**  
2 **September 30, 1996**

3 **Description**

4 This work includes all materials for the construction and installation of the fabric pad  
5 bearings as shown in the Plans and as specified.

6  
7 The fabric pad bearing consists of an upper unit and a lower unit. The upper unit  
8 includes a sole plate and a stainless steel sheet. The lower unit includes a  
9 polytetrafluorethylene (TFE) sheet, a steel backing plate, a preformed fabric pad, and a  
10 masonry plate, except as shown in the Plans for the transverse restrainer bearings.  
11 The upper and lower units shall be supplied by a single bearing manufacturer.

12  
13 **Materials**

14 The preformed fabric pads shall be composed of multiple layers of duck impregnated  
15 and bound with high quality oil resistant synthetic rubber compressed into resilient  
16 pads of uniform thickness. The duck shall be of highest quality cotton or cotton-  
17 polyester 50-50 blend, and shall weigh a minimum of 8 ounces per square yard. The  
18 cotton warp and the filling yarn shall be 2-ply. The cotton-polyester warp and fill shall  
19 be single yarn, with a minimum breaking strength by grab method of 150 pounds per  
20 inch per width (piw) warp, and 140 piw fill. The filling count of the duck shall be  $40 \pm 2$   
21 threads per inch and the warp count shall be  $50 \pm 1$  thread per inch. The duck shall be  
22 certified to conform to the above. The number of plies shall be such as to produce the  
23 specified thickness, after compression and vulcanizing. The finished pads shall  
24 withstand compression loads perpendicular to the plane of the laminations of not less  
25 than 10,000 pounds per square inch without any sign of failure after the load is  
26 removed. Failure is defined as any breakdown of the component materials or  
27 laminations. The preformed fabric pad shall have a shore A hardness of  $90 \pm 5$ .

28  
29 The TFE self-lubricating bearing sheet shall be 1/8 inch thick unless otherwise noted in  
30 the Plans. The TFE sheet shall be composed of 100 percent virgin (unfilled)  
31 polytetrafluorethylene polymer except where filled TFE is called for in the Plans. The  
32 TFE sheet shall be recessed and bonded to a depth of one half the TFE sheet  
33 thickness into the steel backing plate. The exposed height of the TFE shall be not less  
34 than 3/64 inch. The substrate shall limit the flow (elongation) of the confined TFE to  
35 not more than .009 inch under a load of 2,000 psi for 15 minutes at 78 degrees F for a  
36 2-inch x 3-inch test sample. Dimpled TFE, if shown in the Plans, shall be unfilled and  
37 have a minimum thickness of 3/16 inch. Dimples shall be placed in a 1/2 inch grid and  
38 shall have a depth of 1/16 inch. The properties of the (unfilled) TFE shall be certified  
39 to conform to the following requirements:

40

<u>Requirement</u>	<u>Test Method</u>	<u>Value</u>
41		
42		
43 Hardness at 78°F	ASTM D 2240	50-65 Durometer D
44 Tensile Strength, psi	ASTM D 1457	2800 (Min. Avg.)
45 Elongation %	ASTM D 1457	200 (Min. Avg.)
46 Specific Gravity	ASTM D 792	2.14 to 2.21
47		

48 The filled TFE sheet shall be made from virgin TFE resin uniformly blended with inert  
49 filler material (15% glass fiber). The properties of (filled) TFE shall be certified to  
50 conform to the following requirements:

51

1	Requirement	Test Method	Value
2			
3	Tensile Strength	ASTM D 1457	2200 psi (Min. Avg.)
4	Elongation %	ASTM D 1457	150% (Min. Avg.)
5	Specific Gravity	ASTM D 792	2.2
6	Melting Point	ASTM D 1457	327C±10C
7			
8	The stainless steel sheet shall be no less than 14 gage meeting ASTM A 240 Type		
9	304 specifications. Stainless steel in contact with the TFE shall have a finish of 10		
10	microinches R.M.S. (Root-Mean-Square) or less. The stainless steel sheet shall be		
11	seal welded all around to the sole plates by the gas tungsten-arc welding process		
12	(GTAW) in accordance with applicable AWS recommended practices. The seal weld		
13	shall not protrude beyond the surface of the stainless steel. The stainless steel sheet		
14	shall be clamped down to have full contact with the sole plate during welding. The		
15	surface of the sole plate in contact with the stainless steel sheet shall have a surface		
16	roughness of 125 microinches R.M.S.		
17			
18	The sole plate, steel backing plate, bars and masonry plate shall conform to AASHTO		
19	M 183 and the dimensions shall comply with the details as shown in the Plans. The		
20	surface of the recess of the steel backing plate shall have a surface roughness of 250		
21	microinches R.M.S. All exposed steel plate surfaces, except stainless steel surfaces,		
22	shall be painted in accordance with the Special Provision <b>APPLICATION OF PAINT.</b>		
23	The stainless steel sheet to sole plate seal weld shall be painted in accordance with		
24	the Special Provision <b>APPLICATION OF PAINT.</b> ASTM A 449 bolts, nuts, and		
25	washers shall be hot-dip galvanized in accordance with AASHTO M 232.		
26			
27	<b>Submittals</b>		
28	A. Shop Plans		
29			
30	1. Before fabrication of any bearing, the Contractor shall submit shop plans to		
31	the Engineer for approval in accordance with Section 6-03.3(7). These		
32	drawings shall include but not be limited to the following information:		
33			
34	a. Plan and elevation of the bearing showing dimensions and		
35	tolerances.		
36			
37	b. Complete details of all components and sections showing all		
38	materials incorporated into the bearing.		
39			
40	c. All AASHTO, ASTM or other material designations.		
41			
42	d. Bearing manufacturer's recommendations and procedures for		
43	bearing assembly shipment and storage.		
44			
45	B. Basis of Acceptance		
46			
47	Prior to the installation of the fabric pad bearings in part or in whole, the		
48	Contractor shall submit to the Engineer the following test reports, certifications,		
49	and samples for review, testing and approval.		
50			
51	1. Manufacturer's certificate of compliance for the polytetrafluorethylene		
52	(TFE) sheeting, fabric, and elastomer.		
53			
54	2. Certified mill test reports for all steel and stainless steel in the bearing		
55	assemblies.		
56			

- 1 3. Certified test reports confirming that the preformed fabric pads meet the  
2 specified requirements of proof load.  
3  
4 4. Samples of the preformed fabric pads, size 6" x 6" x 1", and TFE sheet,  
5 size 2" x 3" x 1/8", from the production material.  
6

7 The time to test and review the submitted items will be a minimum of 15 calendar  
8 days from the time these items are received at the Engineer's office until the  
9 necessary information is returned to the Contractor at the project site. The actual  
10 time required for review is dependent upon the completeness and accuracy of the  
11 material as submitted. Any deficiencies will require additional time for review. If  
12 submittals are returned to the Contractor to correct deficiencies, an additional 15  
13 calendar days may be required for the review process.  
14

15 Field inspection of a representative number of bearings assemblies will be  
16 performed by the Engineer. A clean dry and enclosed area shall be provided by  
17 the Contractor. The Engineer will identify the bearing assemblies to be inspected  
18 and the Contractor shall do all the necessary work to allow the Engineer to  
19 inspect the bearing assemblies.  
20

## 21 **Construction Requirements**

22 Flatness of bearing surfaces shall be determined by the following method:  
23

- 24 A. A precision straightedge, longer than the nominal dimension to be measured  
25 shall be placed in contact with the surface to be measured as parallel to it as  
26 possible.  
27  
28 B. Select a feeler gauge having an accuracy of  $\pm .001$  inch equal to the  
29 tolerance allowed and attempt to insert it under the straightedge.  
30  
31 C. Surfaces are acceptable if the feeler gauge does not pass under the  
32 straightedge.  
33  
34 D. In determining the flatness, the straightedge may be located in any position  
35 on the surface being measured.  
36

37 Flatness tolerances shall be defined as follows:  
38

- 39 A. Class A tolerance =  $0.0005 \times \text{nominal dimension}$   
40  
41 B. Class B tolerance =  $0.001 \times \text{nominal dimension}$   
42  
43 C. Class C tolerance =  $0.01 \times \text{nominal dimension}$   
44

45 (Nominal dimension shall be taken as the actual dimension of the plate or sheet  
46 under the straightedge, in inches.)  
47

48 Manufacturing tolerances for the bearings are as follows:  
49

- 50 A. TFE Sheet  
51 Plan dimensions: Total nominal design area -0,  
52 +1/8"  
53 Thickness: -0", + 1/64"  
54 Flatness: Class B tolerance, both surfaces  
55

1	B. Stainless Steel Sheet	
2	Plan dimensions:	-0", +3/16"
3	Flatness:	Class B tolerance, both surfaces
4		
5	C. Sole Plate	
6	Plan dimensions:	-0", +3/16"
7	Thickness:	-1/16", +3/16"
8	Flatness:	Class B tolerance, side in contact
9		with the Stainless Steel
10		Class C tolerance, side in contact
11		with epoxy gel, grout, or concrete
12		
13	D. Steel Backing Plate	
14	Plan dimensions:	-0", +3/16"
15	Thickness:	-0", +3/16"
16	Width and length	
17	of recess:	-0", +1/16", of TFE sheet size
18	Flatness:	Class B tolerance, both surfaces
19		
20	E. Fabric Pad	
21		
22	Plan dimension:	-0", +3/16"
23	Thickness:	-1/16", +3/16"
24	Surface finish:	For preformed fabric pads fabricated from
25		multiple layers, the vertical face shall be
26		free of visible horizontal displacement
27		between the individual layers.
28		
29	F. Masonry Plate & Bars	
30		
31	Plan dimension:	-0", +3/16"
32	Thickness:	-0", +3/16"
33	Flatness:	Class B Tolerance, side in contact with
34		masonry plate or bars. Class C tolerance,
35		free side or side in contact with grout.
36		
37	G. Overall Height	
38		
39	Total thickness:	-0, +10 percent
40		

The Contractor shall protect the bearing assemblies from all damage, and exposure to the elements, during shipment and storage prior to installation in accordance with the manufacturer's recommendations and procedures listed in the shop plans as approved by the Engineer.

The sliding surfaces shall be finished true, lubricated and installed level or installed as shown in the Plans for transverse restrainer bearings.

A uniform thin film of silicone grease shall be applied to the entire TFE sheet before installation.

For cast-in-place concrete superstructures the sole plates shall be anchored to the structure as shown in the Plans.

1 For precast concrete superstructures and steel superstructures the sole plates shall be  
2 set with epoxy gel just before setting the superstructure in place. The sole plate top  
3 surface in contact with the epoxy gel shall receive a thin uniform film of silicone  
4 grease, to prevent bonding to the epoxy gel. The anchor bolts and insert threads shall  
5 be greased to prevent bonding and allow future removal. Apply epoxy gel by troweling  
6 it into the concrete recess or onto the bottom of the steel superstructure and  
7 immediately bolting the sole plate in place to obtain a level surface. Before the epoxy  
8 gel has cured, the superstructure shall be set in place, squeezing out excess epoxy  
9 gel while filling the entire recess. Excess epoxy and grease shall be removed  
10 immediately. Special care shall be exercised at all times to ensure protection of the  
11 stainless steel and TFE surfaces from coming in contact with concrete or any other  
12 foreign matter. After the epoxy gel has cured, the anchor bolts shall be tightened to  
13 snug tight.

14  
15 The silicone grease shall conform to military specification MIL-S-8660.

16  
17 The epoxy gel shall conform to the requirements of Section 9-26.1, Type 1, Grade 3,  
18 Class A, B, or C. The Contractor shall submit certification from the manufacturer that  
19 certifies the silicone grease and epoxy meets these specifications.

20  
21 The lower contact surface of the TFE sheet shall be bonded to the steel backing plate  
22 with epoxy specified by the TFE manufacturer. The grout pad and masonry plate shall  
23 be installed level. The grout pad shall be pressure installed starting at the middle of  
24 the masonry plate.

25  
26 All forms and debris that tend to interfere with the free action of the bearing assemblies  
27 shall be removed at the time falsework and forms are removed.

28  
29 **Payment**

30 All costs in connection with furnishing, testing, and installing the bearings as shown in  
31 the Plans and as specified shall be included in the \*\*\* \$\$1\$\$ \*\*\*.